

REMARKS

By this Amendment, claims 200, 229, 230, 234, 253, 254, 273, 274, 278, 294, 311, 312, 321, and 322 have been cancelled, and the remaining claims amended to further define Applicant's invention.

In view of the foregoing amendments and remarks, Applicant respectfully requests the reconsideration and timely allowance of the above-identified application.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 50-1066.

Respectfully submitted,

MARTIN & FERRARO, LLP

Dated: January 7, 2003

By: Thomas H. Martin
Thomas H. Martin
Registration No. 34,383
Attorney for Applicant

14500 Avion Parkway, Suite 300
Chantilly, VA 20151-1101
Telephone: (703) 679-9300
Facsimile: (703) 679-9303

PATENT
Attorney Docket No. 101.0050-00000
Customer No. 22882

CHANGES TO THE CLAIMS

Please amend the claims as follows:

173. (Amended) A non-threaded interbody spinal fusion implant for insertion across the height of a disc space between adjacent vertebral bodies of a human spine, the implant comprising:

a body having a mid-longitudinal axis, an insertion end, a trailing end being larger than said insertion end, a length between said ends, and an upper portion adapted to be oriented toward one of the adjacent vertebral bodies, a lower portion adapted to be oriented toward the other of the adjacent vertebral bodies, and a height between said upper portion and said lower portion transverse to the length, the height of said upper and lower portions along a portion of the length of said implant being constant~~outer surface including bone engaging means for engaging said implant to adjacent vertebral bodies of the spine, said trailing end being adapted to engage instrumentation for the insertion of said implant, said body having at least two openings in communication with one another for permitting the growth of bone from adjacent vertebral body to adjacent vertebral body through said implant; and~~

~~the outer locus of said~~ a non-threaded bone engaging means extending from at least a portion of said upper and lower portions adapted to engage said implant to the adjacent vertebral bodies of the spine forming a substantially frusto-conical configuration along at least a portion of said bone engaging means that is adapted to contact the adjacent vertebral bodies when implanted in the spine, said bone engaging means having a maximum height that increases from

one of said ends to the other of said ends along at least a portion of the length of said body where the height of said upper and lower portions is constant~~said substantially frusto-conical configuration being along at least a portion of the length of said implant nearer said trailing end than said insertion end, said implant being made of a material appropriate for human implantation.~~

174. (Amended) The spinal fusion implant of claim 173 in which said body includes two opposed sides between said upper and lower portions, said sides being planar along at least a portion of the length~~said body has a substantially frusto-conical configuration along a sufficient portion of said implant that is adapted to contact the adjacent vertebral bodies when implanted in the spine so as to maintain an angulation of the adjacent vertebral bodies relative to one another.~~
175. (Amended) The spinal fusion implant of claim 173 in which said upper and lower surfaces form at least a portion of a cylinder~~said body has a substantially cylindrical configuration.~~
179. (Amended) The spinal fusion implant of claim 173 in which said body has a plurality of openings ~~for retaining~~adapted to retain fusion promoting material.
180. (Amended) The spinal fusion implant of claim 173 in which said bone engaging means includes a~~said~~ outer surface that is being porous at least in part porous.
191. (Amended) The spinal fusion implant of claim 187 in which said body has ~~means~~ a cap for closing said accessing means.
195. (Amended) The spinal fusion implant of claim 173 in which said body has a ~~longitudinal central axis and~~ at least one truncated side forming a planar surface parallel to ~~said central~~the mid-longitudinal axis.

216. (Amended) The spinal fusion implant of claim 212 in which said body has ~~means~~ a cap for closing said accessing means.
223. (Amended) A non-threaded interbody spinal fusion implant for insertion across the height of a disc space between the adjacent vertebral bodies, the implant comprising a body having a substantially frusto-conical configuration along a sufficient portion of said body that is adapted to contact the adjacent vertebral bodies when implanted in the spine so as to maintain an angulation of the adjacent vertebral bodies relative to one another, said body having at least two openings in communication with one another for permitting the growth of bone from adjacent vertebral body to adjacent vertebral body through said implant, said body having, an insertion end, a trailing end being larger than said insertion end, and an outer surface including bone engaging ~~means-projections~~ for engaging said implant to the adjacent vertebral bodies, ~~said trailing end being adapted to engage instrumentation for the insertion of said implant~~, the outer locus of said bone engaging ~~means-projections~~ forming a substantially frusto-conical configuration, at least one of said bone engaging means-projections having a forward portion oriented toward said insertion end and being adapted ramped to facilitate linear insertion of said implant into the disc space and having a rearward portion oriented toward said trailing end adapted to while ~~resisting~~resist expulsion of said implant in a direction opposite to the direction of insertion, said implant being made of a material appropriate for human implantation.
227. (Amended) The spinal fusion implant of claim 223 in which said body includes a

- plurality of openings ~~for retaining~~adapted to retain fusion promoting material.
228. (Amended) The spinal fusion implant of claim 223 in which said bone engaging ~~means~~projections include ~~includes~~ said outer surface being ~~porous~~ at least in part porous.
231. (Amended) The spinal fusion implant of claim 223 in which said bone engaging ~~means~~ projections comprise ~~comprises~~ a mesh-like material having a plurality of interstices ~~for receiving~~adapted to receive fusion promoting material.
232. (Amended) The spinal fusion implant of claim 223 in which said bone engaging ~~means~~ ~~includes~~ projections include a plurality of surface roughenings for engaging said adjacent vertebral bodies and for maintaining said implant in place, said surface roughenings being present on at least a portion of said outer surface of said implant.
236. (Amended) The spinal fusion implant of claim 235 in which said internal chamber is ~~capable of containing~~configured to contain fusion promoting material.
239. (Amended) The spinal fusion implant of claim 235 in which said body has ~~means~~ a cap for closing said accessing means.
246. (Amended) A non-threaded interbody spinal fusion implant for insertion across the height of a disc space between adjacent vertebral bodies of a human spine, the implant comprising a body having ~~a substantially cylindrical configuration~~, an insertion end, a trailing end, and an outer surface including a plurality of posts having a head and a stem, said head being wider than said stem, said stem having a first portion proximate said head and a second portion proximate said body, a maximum dimension transverse to the length of said stem at said

second portion being smaller than a maximum dimension transverse to the length of said stem at said first portion, said posts being spaced apart along at least a portion of said outer surface of said body for engaging said implant to adjacent vertebral bodies of the spine, ~~the locus of said plurality of posts forming a substantially cylindrical configuration,~~ said body having at least two openings in communication with one another for permitting the growth of bone from adjacent vertebral body to adjacent vertebral body through said implant, said implant being made of a material appropriate for human implantation.

250. (Amended) The spinal fusion implant of claim 246 in which said body includes a plurality of openings ~~for retaining~~ adapted to retain fusion promoting material.
251. (Amended) The spinal fusion implant of claim 246 in which said outer surface is ~~porous~~ at least in part porous.
256. (Amended) The spinal fusion implant of claim 255 in which said internal chamber is ~~capable of containing~~ adapted to contain fusion promoting material.
259. (Amended) The spinal fusion implant of claim 255 in which said body has ~~means~~ a cap for closing said accessing means.
266. (Amended) A non-threaded interbody spinal fusion implant for insertion across the height of a disc space between two adjacent vertebral bodies of a human spine, the implant comprising a body having a substantially frusto-conical configuration along a sufficient portion of said body that is adapted to contact the adjacent vertebral bodies when implanted in the spine so as to maintain an angulation of the adjacent vertebral bodies relative to one another, said body having at least two openings in communication with one another for permitting

the growth of bone from adjacent vertebral body to adjacent vertebral body through said implant, said body having, an insertion end, a trailing end being larger than said insertion end, and an outer surface including bone engaging means-projections for engaging said implant to the adjacent vertebral bodies, ~~said trailing end being adapted to engage instrumentation for the insertion of said implant,~~ said bone engaging means-projections having a forward portion oriented toward said insertion end and being adapted-ramped to facilitate linear insertion of said implant into the disc space while resisting and having a rearward portion oriented toward said trailing end adapted to resist expulsion of said implant in a direction opposite to the direction of insertion, said implant being made of a material appropriate for human implantation.

271. (Amended) The spinal fusion implant of claim 266 in which said body includes a plurality of openings ~~for retaining~~ adapted to retain fusion promoting material.
272. (Amended) The spinal fusion implant of claim 266 in which said bone engaging ~~means includes~~ projections include said outer surface being ~~porous~~ at least in part porous.
275. (Amended) The spinal fusion implant of claim 266 in which said bone engaging ~~means comprises~~ projections comprise a mesh-like material having a plurality of interstices ~~for receiving~~ adapted to receive fusion promoting material.
276. (Amended) The spinal fusion implant of claim 266 in which said bone engaging ~~means includes~~ projections include a plurality of surface roughenings for engaging said adjacent vertebral bodies and for maintaining said implant in

place, said surface roughenings being present on at least a portion of said outer surface of said implant.

280. (Amended) The spinal fusion implant of claim 279 in which said internal chamber is ~~capable of containing~~ configured to contain fusion promoting material.
283. (Amended) The spinal fusion implant of claim 279 in which said body has ~~means~~ a cap for closing said accessing means.
291. (Amended) A non-threaded interbody spinal fusion implant for insertion across the height of a disc space between adjacent vertebral bodies of a human spine, the implant comprising a body having an insertion end, a trailing end being larger than said insertion end, a length between said ends, and an outer surface including bone engaging means-projections for engaging said implant to adjacent vertebral bodies of the spine, ~~said trailing end being adapted to engage instrumentation for the insertion of said implant,~~ said body having at least two openings in communication with one another for permitting the growth of bone from adjacent vertebral body to adjacent vertebral body through said implant, the outer locus of said bone engaging ~~means-projections~~ forming a substantially frusto-conical configuration that is along at least a portion of said bone engaging means-projections that is adapted to contact the adjacent vertebral bodies when implanted in the spine, said substantially frusto-conical configuration being and is along at least a portion of the length of said implant nearer said trailing end than said insertion end, said bone engaging projections having a forward portion oriented toward said insertion end and being ramped to facilitate linear insertion

of said implant in the disc space, said implant being made of a material appropriate for human implantation.

295. (Amended) The spinal fusion implant of claim 291 in which said bone engaging ~~means comprises projections~~ comprise a mesh-like material having a plurality of interstices ~~for receiving~~ adapted to receive fusion promoting material.
296. (Amended) The spinal fusion implant of claim 291 in which said bone engaging ~~means includes projections~~ include a plurality of surface roughenings for engaging said adjacent vertebral bodies and for maintaining said implant in place, said surface roughenings being present on at least a portion of said outer surface of said implant.
301. (Amended) A non-threaded spinal fusion implant for insertion across the height of a disc space between adjacent vertebral bodies of a human spine, said implant comprising a body having an outer locus larger than the space between two adjacent vertebral bodies to be fused and being formed of a mesh-like material capable of supporting two adjacent vertebral bodies in a spaced apart relationship to each other, said mesh-like material having a plurality of interstices ~~for receiving~~ adapted to receive fusion promoting material and for engaging said implant to said adjacent vertebral bodies of the spine, said interstices being along at least a portion of said outer locus of said body and within at least a portion an interior of said body, said body being adapted to permit the growth of bone from adjacent vertebral body to adjacent vertebral body through said implant, said implant being made of a material appropriate for human implantation.

309. (Amended) A non-threaded interbody spinal fusion implant for insertion across the height of a disc space between two adjacent vertebral bodies of a human spine, the implant comprising a body having an insertion end, a trailing end, a length between said ends, arcuate portions adapted to contact the adjacent vertebral bodies when implanted in the spine, and a distance between said arcuate portions increasing from said insertion end to said trailing end along a sufficient portion of the length of said implant so as to maintain angulation of the adjacent vertebral bodies relative to one another, ~~said trailing end being adapted to engage instrumentation for the insertion of said implant;~~ said body having at least two openings in communication with one another for permitting the growth of bone from adjacent vertebral body to adjacent vertebral body through said implant; and

bone engaging ~~means~~ projections for engaging said implant to the adjacent vertebral bodies, at least one of said bone engaging projections having a forward portion oriented toward said insertion end and being ramped to facilitate linear insertion of said implant into the disc space.

310. (Amended) The spinal fusion implant of claim 309 in which said bone engaging ~~means includes~~ projections include second arcuate portions oriented toward the adjacent vertebral bodies.
313. (Amended) The spinal fusion implant of claim 311 in which said bone engaging ~~means comprises~~ projections comprise a mesh-like material having a plurality of interstices ~~for receiving~~ adapted to receive fusion promoting material.

314. (Amended) The spinal fusion implant of claim 311 in which said bone engaging ~~means includes~~ projections include a plurality of surface roughenings for engaging said adjacent vertebral bodies and for maintaining said implant in place, said surface roughenings being present on at least a portion of said outer surface of said implant.

320. (Amended) A non-threaded interbody spinal fusion implant for insertion across the height of a disc space between two adjacent vertebral bodies of a human spine, the implant comprising:

a body having a insertion end, a trailing end, a length between said ends, and an outer surface including bone engaging ~~means~~ projections for engaging said implant to the adjacent vertebral bodies, said bone engaging ~~means~~ projections having arcuate portions adapted to contact the adjacent vertebral bodies when implanted in the spine, and a distance between said arcuate portions increasing from said insertion end to said trailing end along a sufficient portion of the length of said implant so as to maintain an angulation of the adjacent vertebral bodies relative to one another, ~~said trailing end being adapted to engage instrumentation for the insertion of said implant, at least one of said~~ bone engaging projections having a forward portion oriented toward said insertion end and being ramped to facilitate linear insertion of said implant into the disc space, said body having at least two openings in communication with one another for permitting the growth of bone from adjacent vertebral body to adjacent vertebral body through said implant.

323. (Amended) The spinal fusion implant of claim 320 in which said bone engaging ~~means comprises~~ projections comprise a mesh-like material having a plurality of interstices ~~for receiving~~ adapted to receive fusion promoting material.
324. (Amended) The spinal fusion implant of claim 320 in which said bone engaging ~~means includes~~ projections include a plurality of surface roughenings for engaging said adjacent vertebral bodies and for maintaining said implant in place, said surface roughenings being present on at least a portion of said outer surface of said implant.
330. (Amended) A non-threaded spinal fusion implant for insertion across the height of a disc space between adjacent vertebral bodies of a human spine, said implant comprising a body having an outer locus larger than the space between two adjacent vertebral bodies to be fused and being formed of a cancellous material other than bone capable of supporting two adjacent vertebral bodies in a spaced apart relationship to each other, said cancellous material having a plurality of interstices for holding fusion promoting material and for permitting the growth of bone from adjacent vertebral body to adjacent vertebral body through said cancellous material, said implant being made of a material appropriate for human implantation.